

What is Claimed is:

1 1. An automated, computer-based reading tutoring system comprising
2 at least one domain of discourse accessible by a student via a computer system, said at
3 least one domain of discourse including a plurality of instructional passages of different,
4 predetermined levels of reading difficulty available for the student to read via a monitor of the
5 computer system;

6 semantic space method means for receiving a summary prepared by the student and
7 submitted via the computer system of one of said instructional passages read by the student, said
8 semantic space method means being adapted to automatically evaluate the summary for
9 congruence with said one of said instructional passages and to automatically determine which of
10 said instructional passages from said domain of discourse the student should read next based on
11 the congruence of the summary with said one of said instructional passages; and

12 immediate feedback data capable of being provided to the student via the computer system
13 and including an indicator reflective of the congruence of the summary with said one of said
14 instructional passages and including the identity of which of said instructional passages the
15 student should read next.

1 2. The automated, computer-based reading tutoring system as recited in claim 1 and
2 further including one or more semantic spaces produced by a machine-learning method and
3 wherein said semantic space method means includes one or more semantic space algorithms
4 operating on said one or more semantic spaces.

1 3. The automated, computer-based reading tutoring system as recited in claim 2
2 wherein said machine-learning method includes a machine learning algorithm such as latent
3 semantic analysis.

1 4. The automated, computer-based reading tutoring system as recited in claim 2 and
2 further including a graphical user interface by which said reading tutoring system communicates
3 with the student via the computer system.

1 5. The automated, computer-based reading tutoring system as recited in claim 2 and
2 further including a comprehension tutor module accessible by the student via the computer

3 system, said comprehension tutor module being adapted to present the student with interactive
4 summarizing instruction and exercises via the computer system.

1 6. The automated, computer-based reading tutoring system as recited in claim 5
2 wherein said comprehension tutor module is adapted to communicate key words from said one
3 of said instructional passages.

1 7. The automated, computer-based reading tutoring system as recited in claim 5
2 wherein said comprehension tutor module is adapted to present the student with a cloze activity.

1 8. The automated, computer-based reading tutoring system as recited in claim 5
2 wherein said comprehension tutor module is adapted to present the student with a sequencing
3 activity.

1 9. The automated, computer-based reading tutoring system as recited in claim 5
2 wherein said comprehension tutor module is adapted to present the student with a concept
3 identification activity.

1 10. The automated, computer-based reading tutoring system as recited in claim 5
2 wherein said comprehension tutor module is adapted to present the student with a summary
3 writing activity including the option to submit a practice summary, said semantic space method
4 means is adapted to receive a practice summary prepared by the student and submitted via the
5 computer system and to automatically evaluate the practice summary to assess the student's
6 reading comprehension, and said immediate feedback data includes information regarding the
7 quality of the practice summary as a measure of reading comprehension.

1 11. The automated, computer-based reading tutoring system as recited in claim 2 and
2 further including a vocabulary tutor module accessible by the student via the computer system,
3 said vocabulary tutor module being adapted to communicate principal vocabulary words from said
4 one of said instructional passages to the student via the computer system including definitions,
5 synonyms, antonyms, samples of correct usage and to present the student with interactive practice
6 exercises for said principal vocabulary words, said vocabulary tutor module being adapted to
7 automatically evaluate the student's performance on said interactive practice exercises, said

8 immediate feedback data including information regarding the student's performance on said
9 interactive practice exercises.

1 12. The automated, computer-based reading tutoring system as recited in claim 11
2 wherein said vocabulary tutor module selects the principal vocabulary words to be communicated
3 based on word features.

1 13. The automated, computer-based reading tutoring system as recited in claim 12
2 wherein said vocabulary tutor module selects the principal vocabulary words based on word
3 features including word length and commonality.

1 14. The automated, computer-based reading tutoring system as recited in claim 11
2 wherein said vocabulary tutor module is adapted to present the student with an interactive practice
3 exercise including sentences using the principal vocabulary words correctly and incorrectly.
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1 15. The automated, computer-based reading tutoring system as recited in claim 11
2 wherein said vocabulary tutor module is adapted to present the student with an interactive practice
3 exercise including identification of synonyms and antonyms for the principal vocabulary words.
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1 16. The automated computer-based reading tutoring system as recited in claim 11 and
2 further including a voice recognition system capable of receiving audible input from a student via
3 the computer system, said vocabulary tutor module being adapted to present the student with an
4 interactive practice exercise allowing the student to submit an audible reading of the principal
5 vocabulary words for determination of correct pronunciation.
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1 17. The automated, computer-based reading tutoring system as recited in claim 2 and
2 further including a voice recognition system capable of receiving audible input from a student via
3 the computer system and a fluency tutor module accessible by the student via the computer
4 system, said fluency tutor module being adapted to audibly communicate an audibly correct
5 reading of said one of said instructional passages to the student via the computer system, to
6 receive an audible reading of said one of said instructional passages by the student via the
7 computer system, to automatically evaluate the audible reading for accuracy and speed, and to
8 provide immediate feedback data including information regarding the accuracy and speed of the
9

9 audible reading.

1 18. An automated, computer-based reading tutoring system comprising
2 at least one domain of discourse accessible by a student via a computer system, said at
3 least one domain of discourse including a plurality of instructional passages of different,
4 predetermined levels of reading difficulty available for the student to read via a monitor of the
5 computer system;

6 a semantic space derived from a machine learning method;

7 a semantic space module for receiving a summary prepared by the student and submitted
8 via the computer system of one of said instructional passages read by the student, said semantic
9 space module operating on said semantic space to automatically evaluate the summary for
10 congruence with said one of said instructional passages and to automatically determine which of
11 said instructional passages from said domain of discourse the student should read next based on
12 the congruence of the summary with said one of said instructional passages; and

13 immediate feedback data capable of being provided to the student via the computer system
14 and including an indicator reflective of the congruence of the summary with said one of said
15 instructional passages and including the identity of which of said instructional passages the
16 student should read next.

1 19. The automated, computer-based reading tutoring system as recited in claim 18
2 wherein said semantic space is derived from latent semantic analysis using a latent semantic
3 analysis algorithm.

1 20. The automated, computer-based reading tutoring system as recited in claim 18
2 wherein said semantic space is derived from HAL.

1 21. The automated, computer-based method of reading tutoring as recited in claim 18
2 wherein said semantic space is derived from EM.

1 22. The automated, computer-based method of reading tutoring as recited in claim 18
2 wherein said semantic space module includes a semantic space algorithm operating on said
3 semantic space.

1 23. The automated, computer-based method of reading tutoring comprising the steps
2 of providing a domain of discourse accessible by a student via a computer system and
3 including a plurality of instructional passages of different, predetermined levels of reading
4 difficulty;

5 selecting one of the instructional passages to appear on a monitor of the computer system
6 for the student to read;

7 receiving a summary of the selected instructional passage prepared by the student and
8 submitted via the computer system;

9 automatically evaluating the summary for congruence with the selected instructional
10 passage to obtain a measure of the student's reading comprehension;

11 automatically selecting an instructional passage from the domain of discourse that the
12 student should optimally read next based on the measure of the student's reading comprehension;

13 communicating feedback data to the student, via the computer system, including an
14 indicator reflective of the student's reading comprehension and the identity of the instructional
15 passage that the student should optimally read next; and

16 repeating said receiving, said automatically evaluating, said automatically selecting and
17 said communicating steps for the instructional passage that the student reads next.

1 24. The automated, computer-based method of reading tutoring as recited in claim 23
2 wherein said step of receiving includes receiving an audible summary from the student.

1 25. The automated, computer-based method of reading tutoring as recited in claim 23
2 wherein said step of automatically evaluating and said step of automatically selecting are
3 performed using semantic space algorithms.

1 26. The automated, computer-based method of reading tutoring as recited in claim 25
2 wherein said step of automatically selecting includes selecting the passage that the student should
3 optimally read next based on the congruence of the summary with the selected instructional
4 passage.

1 27. The automated, computer-based method of reading tutoring as recited in claim 25
2 wherein said step of automatically selecting includes selecting the passage that the student should
3 optimally read next based on the congruence of the summary with the other passages in the

4 domain.

1 28. The automated, computer-based method of reading tutoring as recited in claim 23
2 and further including the steps of providing the student access to an automated comprehension
3 tutor, providing the student access to an automated vocabulary tutor and providing the student
4 access to an automated fluency tutor via the computer system, and wherein said step of repeating
5 includes repeating said steps of providing the student access to the comprehension tutor, the
6 vocabulary tutor and the fluency tutor.

1 29. The automated, computer-based method of reading tutoring as recited in claim 28
2 wherein said step of providing the student access to a comprehension tutor includes communicating,
3 via the computer system, key words to the student from the selected instructional
4 passage and presenting the student with interactive summarizing instruction and exercises, and
5 said step of communicating feedback data includes communicating information regarding the
6 student's performance on the interactive summarizing exercises.

1 30. The automated, computer-based method of reading tutoring as recited in claim 28
2 wherein said step of providing the student access to a vocabulary tutor includes communicating,
3 via the computer system, principal vocabulary words to the student from the selected instructional
4 passage including definitions, synonyms, antonyms, samples of correct usage, and interactive
5 practice exercises for the principal vocabulary words, and said step of communicating feedback
6 data includes communicating information regarding the student's performance on the interactive
7 practice exercises.

1 31. The automated, computer-based method of reading tutoring as recited in claim 30
2 wherein said step of communicating principal vocabulary words includes selecting the principal
3 vocabulary words based on one or more word features.

1 32. The automated, computer-based method of reading tutoring as recited in claim
2 31 wherein said step of selecting the principal vocabulary words includes selecting the principal
3 vocabulary words based on word features including word length, frequency of occurrence in
4 printed matter and word difficulty.

1 33. The automated, computer-based method of reading tutoring as recited in claim
2 28 wherein said step of providing the student access to a fluency tutor includes audibly
3 communicating an audibly correct reading of the selected instructional passage to the student via
4 the computer system, receiving an audible reading of the selected instructional passage by the
5 student via the computer system and automatically evaluating the audible reading for accuracy and
6 speed against the correct reading, and said step of communicating feedback data includes
7 communicating information regarding the accuracy and speed of the audible reading.

1 34. The automated, computer-based method of reading tutoring as recited in claim 23
2 wherein said step of automatically selecting includes selecting the instructional passage that the
3 student should optimally read next based on the congruence of the summary with the selected
4 other passages in the domain of discourse.

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1 35. The automated, computer-based method of reading tutoring as recited in claim 23
2 wherein said step of automatically selecting includes selecting the instructional passage that the
3 student should optimally read next based on the congruence of the summary with the selected
4 instructional passage.

1 36. The automated, computer-based method of reading tutoring as recited in claim 23
2 and further including, prior to said step of automatically evaluating, the step of automatically
3 checking the summary for validity.

1 37. An automated, computer-based method of self-guided reading tutoring comprising
2 the steps of
3 accessing a computer-based reading tutoring system via a computer system;
4 viewing a selected instructional passage from a domain of discourse, including a plurality
5 of instructional passages of different, predetermined levels of reading difficulty, of the reading
6 tutoring system on a monitor of the computer system;
7 reading the selected instructional passage;
8 preparing a summary of the selected instructional passage;
9 submitting the summary to the reading tutoring system via the computer system;
10 receiving immediate feedback data from the reading tutoring system via the computer
11 system including an indicator reflective of the congruence of the summary with the selected

12 instructional passage and including the identity of one or more recommended instructional
13 passages from the domain of discourse that should be read next based on the congruence of the
14 summary with the selected instructional passage; and

15 repeating said steps of viewing, reading, preparing, submitting and receiving for one of
16 the recommended instructional passages.

1 38. The automated, computer-based method of self-guided reading tutoring as recited
2 in claim 37 and further including, prior to said step of viewing, the steps of self-selecting the
3 domain of discourse from a plurality of domains of discourse of the reading tutoring system.

1 39. The automated, computer-based method of self-guided reading tutoring as recited
2 in claim 37 wherein said step of submitting includes submitting a written summary.

1 40. The automated, computer-based method of self-guided reading tutoring as recited
2 in claim 37 wherein said step of submitting includes submitting an audible summary.

1 41. The automated, computer-based method of self-guided reading tutoring as recited
2 in claim 37 and further including the steps of preparing a practice summary of the selected
3 instructional passages, submitting the practice summary to the reading tutoring system via the
4 computer system and receiving immediate feedback data from the reading tutoring system via the
5 computer system including information regarding the quality of the practice summary as a measure
6 of reading comprehension.

1 42. The automated, computer-based method of self-guided reading tutoring as recited
2 in claim 37 and further including the steps of viewing principal vocabulary words from the
3 selected instructional passage, including definitions, synonyms, antonyms, and samples of correct
4 usage for the principal vocabulary words, on the monitor.

1 43. The automated, computer-based method of self-guided reading tutoring as recited
2 in claim 37 and further including performing interactive practice exercises, via the computer
3 system, using the principal vocabulary words.

1 44. The automated, computer-based method of reading tutoring as recited in claim 37

2 and further including the steps of listening to an audibly correct reading of the selected
3 instructional passage via the computer system, submitting an audible reading of the selected
4 instructional passage to the reading tutoring system via the computer system and receiving
5 immediate feedback data from the reading tutoring system via the computer system including
6 information regarding the accuracy and speed of the audible reading.